REMARKS

Applicants respectfully request reconsideration of the above-identified patent application in view of the above amendments to the claims and the following remarks.

The Examiner has rejected claim 16 and the claims depending on claim 16 under the provisions of 35 U.S.C. §112, second paragraph, as being indefinite because claim 16 is drawn to a method claim but has structural limitations. Accordingly, claim 16 has been amended to make it clear that it is drawn to a method claim.

The Examiner has also rejected independent claims 1-30 under the provisions of 35 U.S.C.§103 as being unpatentable over U.S. Patent 4,606,638 (Sommargren) in view of U.S. Patent No. 4,762,414 (Grego). The Applicants respectfully request reconsideration of claims 1-30 in view of the following remarks.

In U.S. Patent 4,606,638, Sommargren proposed a polarization phase modulated Fizeau interferometer in which the reference surface is the front surface (54) of a plate polarizer. The modulated interference pattern is detected by a CCD array. The signal provides the absolute distance between the reference surface (54) and the surface (62) of the article under test or more specifically a magnetic head. Although this technique may have used a single measurement to determine the flying height, pitch angle and roll angle, it is of limited value because the measurement accuracy is dependent on the flatness of the reference surface (54) or glass disk surface which acts as a plate polarizer.

Unlike the single wavelength interferometry system of the Sommargren '638 patent, the present invention utilizes a heterodyne interferometry system. The Examiner recognizes the differences the between the Sommargren '638 patent and the claimed invention, but has stated

that it would have been obvious to one of ordinary skill in the art to modify the teachings of the Sommargren '638 patent with heterodyning taught by Grego. The Applicants respectfully disagree.

The Grego patent may disclose a heterodyne interferometry system, but the system is used to measure the optical properties of a thin opaque layer. The Grego patent does not disclose the measurement of the distance between two near contact surfaces such as the flying height distance between and a disk and a magnetic head. Instead, the Grego device measures the distance between the thickness of a thin opaque layer 1 carried by a substrate 2.

There is no motivation for one skilled in the art to substitute the heterodyne interferometry system of Grego for the single wavelength system of Sommargren. In Sommargren's system, there is no thin opaque layer similar to the thin opaque layer 1 in Grego. Instead, Sommargren utilizes is a transparent disk to measure the distance between the bottom surface of the transparent disk 50 and a magnetic head 60, i.e., the flying height distance. If one were to make the substitution suggested by the Examiner, there is no reason to believe that the hypothetical combination would be capable of measuring a flying height distance, instead of measuring the thickness of an opaque film as taught by Grego. The Examiner states that the motivation for such a combination is the alleged knowledge that "heterodying is well known in the art for being more accurate in obtaining clear interference signals." The Examiner has not cited any prior art reference in support of this allegation. Since there is no citation in support of the Examiner's alleged motivation for combining references, and since there is also no explanation of how a system designed to measure

opaque films can be modified to measure flying height distances, the Examiner is respectfully requested to withdraw his rejection based upon 35 U.S.C. §103.

It is respectfully submitted that the Applicants' claimed invention of the independent claims 1 and 16 is not obvious in view of the combination of the Sommargren and Grego references as suggested by the Examiner. It is also respectfully submitted that dependent claims 2-15 and 17-30 are patentable for at least the same reasons as claims 1 and 16.

The Applicants believe that the present case is in condition for allowance, and the Examiner is requested to pass the present case to issue.

Respectfully submitted,

BURNS, DOANE, SWECKER & MATHIS, L.L.P.

By: _____

Richard J. McGrath
Registration No. 29,195

P.O. Box 1404
Alexandria, Virginia 22313-1404
(703) 836-6620

Date: April 1, 2003

Attorney's Docket No. 032501-006

Mark-Up of Claims

Attachment to Amendment dated April 1, 2003

16. (Twice Amended) A method for high speed and precision measurement of the distance between at least two near contact surfaces, one of which is an optically transparent element and the other is a substantially non-transparent element using heterodyne interferometry, comprising:

producing with a laser source,an output having two superimposed orthogonally polarized beams having S and P polarization, with a frequency difference between them;

splitting the polarized beams into measurement and reference beams without altering the characteristics of the polarized beams;

[means for] causing the reference beams to interfere;

detecting with a reference photo detector the reference beams and providing a reference signal;

causing the measurement beam to strike the object of interest at an oblique angle after passing through a glass plate having a polarization coating on the bottom surface close to the object of interest, the oblique angle is such that the S polarization of the incident beam is reflected from the bottom surface of the polarization coated glass plate and the P polarization refracts through the glass plate, the P polarization reflects from the substantially non-transparent object of interest and refracts to the glass plate;

Mark-Up of Claims

causing the reflected S and P polarization beams from the bottom surface of the glass plate and the surface of the object respectively to interfere;

detecting with a measurement photo detector the measurement beams and providing a measurement signal; and

determining the distance between the bottom surface of the glass [disk] plate and the object surface based on the phase [deference] difference between the measurement and reference signals from the measurement and reference photo detectors.